

little expanded above, thickened and reflexed below. Basal lip with short, white, obtusely triangular tooth, projecting in the plane of the last whorl, not projecting into the aperture.

Alt. 1.2 mm., diam. 3.5 mm., s. diam. 2.8 mm.

Four living specimens of this shell were collected. It belongs to the subgenus *Perenna* Guppy. It is smaller, more depressed, darker in color and with less acute liræ than *L. lineata*. In other members of the *lineata* group the basal tooth is squarish and projected into the aperture, but in *pilsbryi* it is broadly pointed and is a continuation of the lower whorl, not projecting into the aperture.

The slightly reflexed upper margin of the aperture, with no trace of tubercular teeth and the small size of the basal tooth, suggest a very slight immaturity. Possibly a larger series would contain older specimens, which would be found to have upper marginal tubercles, and a more strongly developed basal tooth. In any case the shell will be found to be specifically distinct.

Types ; No. 22890 M. C. Z.

NOTES ON MIOCENE CORRELATION.

BY AXEL OLSSON.

The deposits which we have come to recognize as of Miocene age on our Atlantic coastal plain differ in many respects from beds of similar age found in other regions. This uniqueness is due to their faunal characteristics, which were developed under conditions of which we have records nowhere else. Therefore, direct correlation or specific identity of forms is possible in only a few cases, and the Miocene age of these beds is based rather more on stratigraphic than on paleontologic grounds.

The seas of our Eocene and Oligocene periods were rather warm, and hence their faunas find their closest affinities in our present tropical seas. At the close of the Oligocene, conditions began to change. In the Oak Grove sands of Florida the fauna in a slight way portrays the coming Miocene one. However, more important, of which this special case is but a preliminary result, is the inauguration of a great series of orogenetic movements which culminated in a great series of Miocene uplifts. In Europe the whole series of

folding extended from the Pyrenees Mountains in Spain to the Himalayas in Asia. In America the union of the North and South Americas, the fusion of the island of Florida with the mainland, which was again severed towards its close.

As we would naturally expect, a series of such great changes would have some great effect upon the direction of oceanic currents. It is to this that an appeal has been made for the explanation of the uniqueness of our Atlantic coast Miocene faunas. This fauna is one typically developed in cold waters. This being shown especially well by the abundance of *Astartidæ*, *Ledas* and of such *Venericardias* related to our recent *Venericardia borealis*. The warm-water-loving series of the Oligocene retreated to the Antillean region, to return again towards the close of the Miocene and in the Pliocene, when conditions again became favorable to them, to retreat again before the general refrigeration which ushered in the Pleistocene glacial advances. Also further proof of a cold oceanic current creeping south along our coast is to be noted that the Miocene floras of the adjacent mainland indicate a warm, mild climate.

In the course of paleontologic work, it became rather desirable to obtain some immature shells of certain species. In order to do so I began the examining of the sand and marl contained inside of closed valves of several large bivalve shells, amongst which was a specimen of *Melina* (*Perna*) *maxillata* (Deshayes) from the Choptank River, Maryland. In so doing, two small but beautifully preserved valves of a small *Trigoniocardia* were discovered which later were identified as *Cardium* (*Trigoniocardia*) *galvestonense* Harris. They are figured on plate VI, figs. 11, 12.

This species was first described by Professor G. D. Harris from specimens obtained from the deep well drillings of the Galveston Artesian well.¹ Specimens from there are figured, Pl. VI, figs. 8, 9. The maximum depth attained in this well is 2,920 feet of which the interval between 2,158 and 2,920 feet was referred to the Upper Miocene. This fauna is tropical in its make-up, differing conspicuously from the cold Chesapeake fauna which at the same time extended into the Gulf of Mexico, through the Suwanee straits which separated Florida from the main-land. With the typical expression

¹Bull. of American Paleontology. Vol. I, No. 3, p. 91, pl. 1, fig. 3, 3a. Dec. 2, 1895.

of the Chesapeake fauna as developed in Virginia and Maryland, only a few species are held in common, while with the Upper or Duplin Miocene horizon of N. C., agreement is much closer, due as much to similarity of climatic conditions as to a similarity in age.

Besides *Cardium galvestonense* Harris, two other species are available for correlation in both the Chesapeake beds of Maryland and the Miocene of the Galveston well, namely *Mytilus conradinus* Orb. and *Crassinella galvestonensis* Harris. These two species are rather abundant and occur in nearly the whole series of our Miocene beds. The former from New Jersey southward, the latter as far north as Maryland. *Cardium galvestonense* however until its present discovery in the Choptank formation of Maryland has escaped notice outside of its type area. Its distribution is such as to indicate, that it may be expected anywhere in the intermediate area. Its rarity outside of the Texan region, where it is abundant, indicates that it is a warm-water-loving form, finding as Professor Harris notes, its nearest relations with Antillean species. So far it is the only *Trigoniocardia* discovered in our Atlantic coast Miocene beds, although the group is abundantly represented in the Oligocene beneath.

NOTE ON CLEMENTIA OBLIQUA JUKES-BROWNE.

BY WM. H. DALL.

Mr. A. L. Jukes-Browne in the Annals and Magazine of Natural History for July, 1913, p. 60, has published a description of a new species of *Clementia* under the specific name of *obliqua*, which was supposed to come from Porto Rico. By the kindness of J. Cosmo Melvill, Esq., I have been able to examine one of the two specimens upon which this species was founded. It proves not to be a *Clementia*, not to come from Porto Rico, and to be a species described by Carpenter under the name of *Clementia subdiaphana* forty-eight years ago. As *Clementia* was, according to Adams and Woodward, a Dosinoid animal, and the soft parts of this species are Veneroid, it was transferred by me to the genus *Marcia*, section *Venerella*, in my revision of the Veneridæ in 1902. I figured the species in the Proceedings of the U. S. National Museum in 1891 from an exceptionally rotund specimen. Mr. Jukes-Browne's figures are of the more